Promote Integrative farming system to enhance food security and ecosystem restoration in Ethiopia, Doba District.

1. Back ground

The majorities of world population smallholder farmers in developing country are food insecure, malnourished and live in under sub-standard living conditions due to ecosystem degradation, low productivity capacity, land degradation, climate change & variability problems and etc. Ethiopia is one of the most food insecure countries in Sub-Saharan Africa and vulnerable many smallholders due to climate change problem. An estimated 40-60 percent number of country's population is food insecure, while 45% (percent) live below poverty line. Most of population foods insecure are pastoralists and agro-pastoralists community live in arid and semi-arid areas, farmers in drought prone areas, small scale and resource poor farmers. The population of it was still relies on rain-fed production systems for food and income security. Agriculture accounts for over 40% of GDP, employs 80% of the labor force and generates some 90% of export earnings, yet most agricultural activity still occurs within small, subsistence-level farming systems. Whilst average plot sizes vary by region, many households survive on less than a hectare each. Ethiopia suffers from food insecurity with average annual food production growth an estimated 2.4%, lagging behind population growth of 2.8% per annum. The major causes of food insecurity in is environmental degradation, deforestation, climate change and variability, land degradation, lack of improved variety seed input, research extension, recurrent drought, moisture stress and etc. Doba district community is one of the most seriously susceptible and vulnerable by this problem.

Integrated farming systems entail a holistic approach to farming aimed to meet the multiple demands (farm resilience, farmer livelihoods, food security, ecosystem restoration, and making farms adaptive and resilient, etc.). Integrated farming system is characterized by temporal and spatial mixing of crops, livestock, fishery (aquaculture), apiculture and allied activities in a single farm. This farming approach is complex but more productive at landscape level, less vulnerable to volatility, and produces less negative externalities than simplified farms and improve ecological restoration of the area. So, most of the time small holder and marginal farmers are practicing it for their ecological conservation and livelihood purposes. When you compared to integrated farm system (IFS) with single enterprise farm it has the potential to improve ecosystem resilience, farm profitability and employment. As well as Integrated farmer system can improve soil nutrient recycling through composting, mulching, and residue incorporation and can reduce the external inputs of it. This nutrient recycling in turn helps to increase the soil quality indicators such as soil nutrient availability, soil health and also improves soil microbial activity. The Integrated farming system approach have a major role in biodiversity conservation and Improve carbon sequestration of soil through adoption of diversified cropping system, rehabilitating ecology, integration of indigenous livestock breeds and also have significant role in improving soil organic carbon. It can increased carbon sequestration in biomass in take trees, reduced consumption of fertilizers, and reduced pesticides application in farm have significant role in greenhouse gas emission. From those all results in a linked system making it sustainable and climate-resilience.

There is many evidence in many developing countries as Integrated farming system is one mechanism which can maximize productive potential of agriculture and food production systems and purposeful in conservation work. In the past six years we apply here in Doba district is also

additional evidence for this technology packages. As well as widely used as a remedy to alleviate hunger, climate change problem, poverty, food insecurity and ecosystem degradation in the face of a global food crisis at small holder level.

Food security is influenced not only by the quantity of available food but also by its diversity and quality. As a result, access to healthy, diverse, and affordable food is central to household food security and natural resource availability critical one. For increasing availability/ accessibility of food for small holder farmer and improve landscape restoration in this concept note we put two strategic ways. The first one is increase productivity and production potential of small holder farmer from different agriculture, apiculture and aquaculture entity. The second one is, working on physical and biological soil and water conservation on communal and farmland area to enhance ecosystem restoration and integrated landscape management. The third one is scale up best practice to other area to make more promote and influence on policy & advocacy.
Therefore, on this feasible approach it will address and change the small holder farmer social, environmental and economic conditions by the resources available to design and implement on the intervention area. Improve ecosystem service and goods of the area by integrated natural resource management and landscape restoration work. So, integrated farmer system are a time-tested local strategy that are widely adopted and practiced in various circumstances by local communities with this limited resources/land and institutional support.

2. Objective

The main goal of this project is to address the ecological degradation and chronic food insecurity harness problem of smallholder farmer through promoting integrative farming system and landscape restoration work.

2.1 specific Objective

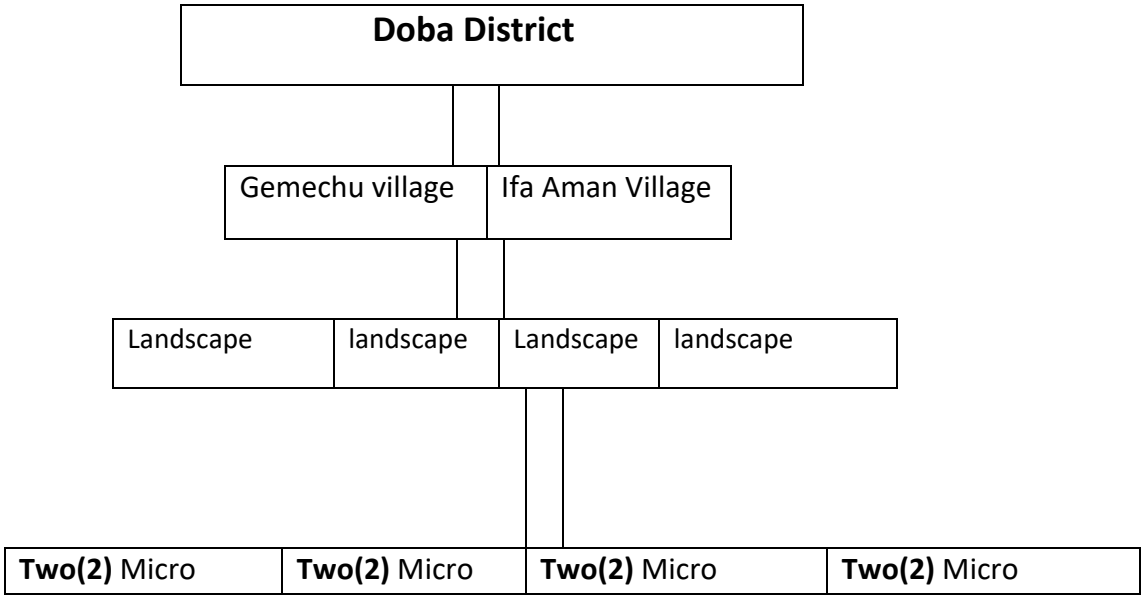
- Promote integrated farming system to improve agricultural productivity potential through diversified cropping system, aquaculture, apiculture, integrated livestock production and improving soil organic carbon fertility/health.
- Restoring 1200 hectare landscape area both on communal and farm land area by working physical and biological structure activities to improve ecosystem service and goods.
- Organizing watershed association and community learning group (CLG) on targeted landscape area to improve their livelihood and capacity building on nature conservation.
- Build up climate resilience (mitigation and adaptation) capacity of small holder farmers.

3. Implementation

I. Project area and Engagement local households

We desire to implement this project where ecosystem strictly destroyed and landscape was degraded due to land degradation, over grazing, misuse of land use system, over exploited cultivation land, mono cropping system, over tillage practice and etc. To overcome this trend we plan to implement this project around East Ethiopia, Oromia regional state of Doba District, at **Gemachu** and **Ifa Aman** rural village; on **1200** hectare area and **200** households. On this project intervention area we plan to work restoration activities on landscape area to divide into micro watershed area of communal land. As well as on farming/cultivation land area based on its land topographic features practicing intercropping, agroforestry, apiculture, aquaculture, ally cropping and establishing farmer private nursery site. On communal land area during winter season working soil & water conservation physical structure like eye brow, bench terrace, stone bunds and etc. In then during summary season working soil & water conservation biological activities like, replanting tree seedlings & grass, sowing grass seed and other shrubs, area protection, free & rotational grazing, promoting self-regeneration and etc. Secondly on farm land area establishing soil organic fertility management center, integrate apiculture, vegetable production, fruit production & cereal crop on a single land plot for conservation and economic purpose. As well as Integrate aquaculture, poultry farm, water harvesting technology, vegetable, fruit plants, forage production, Silvo-pastoral and apiculture on a single land plot for conservation and economic purposes.

II. Designing implementation modality and approach



watershed	watershed	watershed	watershed
Fifty(50) Smallholder farmers	**Fifty (50)** Smallholder farmers	**Fifty (50)** Smallholder farmers	**Fifty (50)** Smallholder farmers

III. Project implementation core activities

1. Identifying degraded communal land landscape, watershed and farmland area for conservation & development technology packages.
2. Identifying and developing local crop seed variety, animal and chickens variety, agroforestry on **200** smallholder farmers based agro-ecology of the area for conservation and food security purposes.
3. Organize youth cooperative on watershed rehabilitation area as they work on beekeeping farming, Silvo-pastoral and oxen fattening activities for livelihood & conservation purposes.
4. Work on the extension of agricultural crop diversification, aquaculture, apiculture, household water pond construction, livestock and chicken to increase their productivity capacity and integration of them.
5. Work on soil organic management (SOM), agroforestry, and Climate smart agriculture technology on small holder farmer for development and conservation purposes.
6. Work on postharvest loss minimization technology and promoting local knowledge.
7. Create awareness on climate change & variability, de-carbonization methodology and climate adaptation strategies for small holder.
8. Organizing youth and women on watershed user association on communal land area for practicing Silvo-pastoral, fattening and beekeeping farm.
9. Organize small holder farmer by community learning Group (CLG) on agricultural packages & technology which was done on farm land area.
10. Work with higher institution, multi-stakeholder platform; work on Policy and advocacy gap.

4. Expected result

During the end of project we can achieve the following activities listed below.

I. Improving ecosystem goods and services capacity by making management intervention and self-regeneration to restoring landscape both on communal and farm land area.

II. Minimizing external additional input by promoting agro-ecology, synergy, and agroforestry, increasing biomass and also recycling agricultural outputs.

III. Improving carbon sequestration amount in soil and biomass by restoring ecosystem & landscape and also applying mitigation mechanism to decarbonize emission rise from agricultural and forest sector.

IV. Increase profitability potential and employment opportunity for youth and small holder farmer dwelling in rural area.

V. Build-up **climate/social/economic** resilience capacity of smallholder farmer and ecosyetem.

5. Budget

Sr.No	Activity	Year1				Year2				Budget requested (USD)
		Quarter 1	Quarter 2	Quarter3	Quarter4	Quarter 1	Quarter 2	Quarter3	Quarter4	
1	Conducting inception and platform workshop	*	*							800
2	Delineation of target area and selection of house holds	*	*	*						900
3	Organizing community watershed association on communal area.		*	*	*					1000
4	Organizing community learning group on farm land area work			*	*					600
5	Supply agricultural farm tool for farmer			*		*				1500
6	Capacity building									1650
7	Supplying agricultural inputs for farmers		*		*	*	*	*		2400
8	Purchasing tree and grass seed for communal/farm land area			*	*		*	*		2000
9	Supplying necessary material for		*		*		*			2000

	apiculture and aquaculture work.									
10	Field visit & experience sharing program						*	*	*	800
11	Monitoring and evaluation							*	*	850
12	Promoting, preparing and disseminating best practice documents.								*	500
	Total									15,000

6. Scalability

In the past of one decade many project was implemented in Doba District persistently to solve the community problem on food security and climate change. From that 'Integrated landscape management to enhance food security and ecosystem resilience project' was one pilot project which is implemented in this district for the past six years ago. This project was funded by GEF (Global Environmental Facility) and UNDP (United Nation Development program). During his stay this project achieved good performance activities on some climate change mitigation & adaptation technology like; Ecosystem restoration, agricultural production & productivity improvement mechanism, apiculture, crop diversification, aquaculture, agroforestry, establishing private nursery site for youth group to create job opportunity at rural area and work on integrated natural resource management. So all this packages must be expanded to be scale up by its resource on other non-targeted house hold, villages and district. In this portfolio approach to accomplish different project activities and preparing documents on best practice, success stories disseminated by local media & brochure as it will reach other non-concession area, non-target households and communities. After we noted the necessity of this technology and its approach as it have been good approach & mechanism can easily address the climate change, ecosystem degradation, gender inequality and food & nutrition insecurity problems promote it at national & regional level. To precede it makes influence on policy gap/amendment, lobby & advocacy, action learning program which conduct at national and regional level. The policy makers will convince to favor the transition and support this newly established best approach and performed activities. Finally, make this technology packages include in national strategic plan in the way to be scale up in other parties of country.